Watershed Management Policy For National Forest Lands

A statement in response to the growing interest in the role of national forests in helping to meet western water needs. It has particular reference to the Southwest

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THE NATIONAL FORESTS came into being as "forest reserves" starting in 1891. Since that time, in response to an expanding economy, they have changed from a largely inaccessible hinterland to a territory accessible to millions. The growing pressures for use of the resources of the national forests emphasize the need for restating the objectives and principles of management of these public properties.

The primary purpose of the national forests as stated in the Act of June 4, 1897, is "to improve and protect the forests within the reservation, or for the purpose of securing favorable conditions of water flow, and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States." Over the years Congress has recognized the value and importance of other national-forest resources including forage, wildlife, and recreation.

In 1905 when the national forests were placed under the administration of the Department of Agriculture, the Secretary directed that "All land is to be devoted to its most productive use for the permanent good of the whole people and not for the temporary benefit of individuals or companies—and where conflicting interests must be reconciled the question will always be decided from the standpoint of the greatest good of the greatest number in the long run."

MULTIPLE USE

In accordance with these directives the national forests will continue to be managed so as to make each area yield the combination of uses best suited to the public needs. This is the essence of multiple use. Each area will be considered for all uses to which it is suited and priorities of uses will be established so as to attain the maximum public benefits.

Although the principle of multiple use is simple in concept, often it is difficult to apply because of the impact of one use on another and the competing pressures for preferential use. This conflict of interest is inevitable and to be expected. The equitable resolution of conflicting interests in the use of resources for the long term public benefits is the hard core of Forest Service responsibility in managing the national forests.

The use of, and demand for, the various resources of the national forests has grown with the expansion of the population. Since 1900 the population in the United States has more than doubled. In the past decade recreational use of the national forests has tripled and in 1956 exceeded 52 million visits. One-fourth of these visits were by fishermen and hunters, an increase of 94 percent since 1950. Between 1950 and 1956 the volume of timber cut on the national forests doubled. In 1956 grazing permits were issued to 24,400 farmers and ranchers to graze 3.9 million head of livestock on national-forest ranges. Demands for special uses of national-forest land have increased. There are some 56,000 permits in force

for special uses such as summer homes, pipe and power lines, airports, stores, youth camps, sawmills, ski lifts, and schools, to name only a few. Mining, oil wells, and prospecting add to the number of activities on national-forest lands. In the past two decades an accelerating increase in major water developments has occurred within the national forests. Large public and private reservoirs are situated in the national forests and expansion of water resource development is moving toward the headwater areas where the national forests are situated.

Thus the expanding demands for use of national-forest resources have created conflicts which require establishing priorities both as to management objectives and the use of the resources.

NATIONAL FORESTS IN THE ECONOMY OF THE SOUTHWEST

(Arizona and New Mexico)

Rapid economic expansion in the West since World War II has brought about attendant increases in pressures for greater use of national-forest resources. In the semiarid Southwest, particularly in Arizona, attention has focused on water yield. There the national forests are major sources of water for domestic and municipal use, irrigation agriculture, and industry. Water shortages have become a critical factor in the economy and further development of that region. In some localities, characterized by heavy pumping, water tables have been dropping. Costs of water have risen because of increased pumping costs.

In addition to serving as primary water sources, the national forests of Arizona and New Mexico make other essential contributions to the welfare of those States. The national forests are a major source of timber for the Southwest's lumber industry. For example, from 5.6 million acres of commercial forest land the timber cut in 1956 was 310 million board-feet, an increase of 40 percent since 1950. In Arizona, a pulp industry is being developed which will utilize wood residues and timber not suited or needed for lumber. This will make possible increased thinning operations needed to improve second-growth timber stands.

Opportunities for recreation are an outstanding attraction of the national forests. The higher elevations of these lands afford recreation and climatic relief in the summer to the residents of Arizona, New Mexico, and neighboring States. Visits to the national forests in Arizona and New Mexico to enjoy the climate and scenery, to fish, hunt, camp, ski, or pursue other recreational activities, have increased from 1,600,000 in 1950 to 4,190,000 in 1956. This use is expected to increase still more as highways are improved and additional recreation facilities are made available.

Much of the recreational use of the national forests in the Southwest is associated with opportunities to observe and study wildlife in a natural setting, and to hunt and fish. Hunter and fisherman visits to the national forests of this region increased from 234,000 in 1950 to 395,000 in 1956. Public interest in and use of the wildlife resources are certain to remain at a high level because these Federal lands are open to the public under the prevailing State fish and game laws.

Livestock grazing has been a major use on the Southwest's national forests ever since they were established. About 70 percent of these lands are grazed by domestic animals owned mainly by local people. The demand is greater than the forage supply.

Accompanying the increase in the number of people using the national forests is a substantial increase in the risk of damage to all resources from wildfire. This demands more intensive protection of the interdependent watershed, timber, range, wildlife, and recreational values.

Administration of the national forests under a multiple-use policy in the Southwest, as elsewhere, affords protection to all forest resources and facilitates their useful development. It also provides widespread opportunities for public use and enjoyment of these national properties.

WATER IN THE MULTIPLE-USE MANAGEMENT OF NATIONAL FORESTS IN THE SOUTHWEST

There are two principal parts of watershed management:

(1) Protection of the watershed by stabilizing the soil and thereby preserving and improving water quality.

(2) Management of the area to improve water yields.

Protection of the watershed and water quality will continue to be a primary objective. Water yields will receive major consideration in the multiple-use management of national forests in the Southwest. Modification of management practices to improve water yields will be undertaken when proved practicable by research and trial application and when overall public benefits will be enhanced. Although the general policy will be to favor water in applying the multiple-use principle, this does not mean that in every locality water will be given first priority or that land management always will be oriented toward maximum development of the water resource. For example, in some places recreational values will be dominant, as at camping and picnicking spots or in wilderness and wild areas. In other localities the preservation of natural streamside vegetation for benefits to fish and wildlife would be of first importance. In all instances the relative importance of other resources will be carefully weighed against the

public benefits to be gained by modifying land use practices to enhance water yield. The overall objective is to manage the national-forest lands so as to obtain the optimum combination of uses which will benefit the public as a whole.

PROTECTION AND MANAGEMENT OF WATER RESOURCES ON NATIONAL FORESTS IN THE SALT RIVER WATERSHED

An extended period of below average precipitation in the Southwest, with attendant low streamflow, combined with overpumping of groundwater particularly for agricultural use, has caused serious water shortages in the Salt River valley in Arizona. Attention has been drawn to this situation in a recent report, "Recovering Rainfall," sponsored by the Arizona State Land Department, the University of Arizona, and the Salt River Valley Water Users' Association. That report is aimed at determining the feasibility of increasing water yields from the Salt River watershed by making various changes in vegetative cover. The report is one of a number of efforts giving consideration to means for increasing the useful water supplies in this general area. Other investigations in this field include artificial rainmaking, diversion of Colorado River water, and desalting saline waters.

About 55 percent of the watershed of the Salt River is national-forest land. This land is so situated as to comprise a major source of streamflow originating within the watershed. The Forest Service considers this area as a representative locality in which it will continue work to develop the possibilities of increasing streamflow.

Protection of Water Resources

The first phase of watershed management in the Salt River watershed, as elsewhere on the national forests, is protection of the area to maintain soil stability and preserve water quality. This is accomplished largely through protection from wildfires and incorporating safeguards to water and soil in the development, improvement, and use of all other national-forest resources—timber, forage, wildlife habitat, and recreation. Accompanying this action and providing the basis for it, is a continuing program of Forest Service research for maintenance of soil stability and improvement of infiltration, retardation of rapid storm runoff, and prevention of siltation, all of which help to make water more usable. Several functions of national-forest management and many research projects relate directly to watershed protection.

Fire

Fire prevention and control is a necessary part of watershed management. Its objective is to insure maintenance of a plant cover required for soil sta-

bility and to permit the orderly development and use of all other resources. The Forest Service fire control organization in the Southwest is able to handle the majority of fire situations but is neither manned nor equipped to keep all fires to small size in the worst fire years. This deficiency will be corrected as funds permit.

Although protection from wildfire is essential in national-forest management, prescribed burning as a management tool is being given increased study. Tests are under way in the Southwest to develop and test prescribed burning methods which can be applied to the management and improvement of timber, forage, and wildlife habitat without significant damage to soil and water resources.

Timber

Forest industries are an important part of the economy of northern Arizona. They bear promise of even greater future importance as new wood-using industries become established in the area. Several communities are substantially dependent on forest industries sustained by surrounding forests, most of which are on national forests or Indian reservations.

The 740,000 acres of commercial national-forest timberlands drained by the Salt River system are a significant part of Arizona's forests. They are managed for timber production and soil and water conservation with due regard for other uses, particularly wildlife and recreation. A basic requisite to all these purposes is the protection of the timber stand from fire, insects, and diseases.

In timber harvesting on the national forests, particular attention is given to protection of the watershed values. Measures include layout of cutting areas to protect streamside vegetation; location of road and trail systems to avoid interference with streamflow and to prevent siltation; erosion control measures to stabilize soil disturbed in logging; disposal of logging debris to reduce fire hazard.

Range

Since three-fourths of the national-forest acreage in the Salt River watershed is used for grazing, range management research is particularly important in developing practices which will maintain the best supply of forage and protect soil and water values. Among other things, research by the Forest Service and other Federal and State agencies has developed methods for determining range condition, proper utilization of forage, methods and species for seeding specific areas, and other means of improving and managing for increased forage yields. Current research with significant watershed management aspects also includes determination of the effect on erosion rates of rehabilitation of deteriorated semidesert range and the development of methods to control brush and low-value trees through burning, spraying with chemicals, or other means.

The objective of range management is to restore forage production on deteriorated ranges and to maintain a sustained yield of forage on ranges in satisfactory condition, with adequate regard to maintaining plant cover essential for watershed protection. This is being accomplished by balancing animal numbers with available forage in accordance with best season of use, better distribution of livestock, and proper utilization of the most valuable forage species. These measures are supplemented by construction of range improvements, such as fencing and stock watering places, together with seeding, noxious plant control, and other practices.

Wildlife

The national forests within the Salt River drainage are the habitat for approximately a third of the fish and game resources of Arizona. Wildlife habitat is maintained and improved by integrating all land use practices with wildlife needs and by enhancing water, food, and cover conditions. Resource development in the drainage is planned and executed so that wildlife habitat will receive optimum benefits consistent with other uses.

The Forest Service works closely with the Arizona Fish and Game Department to formulate and advance management programs that will balance big-game numbers with the available forage. A cooperative game management project between the Forest Service, the State Fish and Game Department, and the Salt River Valley Water Users' Association is under way at Three Bar on the Tonto National Forest. Research in this area includes a study to determine the effects of watershed treatment on wildlife population, sediment production, and streamflow.

Recreation

In the Salt River basin the national forests have outstanding recreational values. Recreation uses do not appreciably affect watershed values except locally where concentration of use destroys ground cover and compacts soils. The results are increased erosion and stream siltation.

To minimize these undesirable effects, efforts are made to develop and maintain intensively used recreation areas so as to spread out use and to restore plant cover on areas that are damaged. Recreation depends on the maintenance of a natural forest environment. Therefore, modification of cover for watershed management or other purposes must be carefully integrated to protect recreation values. Recreational use does not consume significant amounts of water and does not appreciably affect water yield from the watersheds.

Management To Increase Water Yield

Studies by the Forest Service in the Salt River watershed and elsewhere throughout the United

States have established certain principles of watershed management to increase water yields. Among these are the following: Deep-rooted plants create greater soil-moisture deficits than plants with shallower root systems; these deficits must be replenished before water will percolate through the soil to recharge groundwater and maintain streamflow; thinning dense coniferous stands on north slopes in areas of heavy snowfall will allow more snow to reach the ground and thereby increase water available to streamflow; on deep soils conversion from deep-rooted to shallow-rooted vegetation will result in more water available to streamflow if conditions for infiltration are satisfactory and precipitation is sufficient to wet down through the root zone.

Research currently underway in the Salt River drainage at the Sierra Ancha Experimental Watersheds or nearby areas to provide information on water yields includes removal of chaparral and replacement by grass; partial harvest cuttings in pine-fir types; progressive clear cutting in the pine-fir type along streambanks, middle and upper slopes; removal of phreatophytes and replacement by less water-demanding species.

Research results and principles must be tested on a large scale to determine the quantitative effects under local conditions, impacts on other resources, and costs and benefits of such treatments. The Forest Service is moving ahead with a program of pilot testing of watershed management practices to increase water yield. This is being done in the Beaver Creek watershed, a 275,000-acre tributary of the Salt River basin. Practices now being tested are conversion of the juniper and sparse pine types to grass and thinning of pine on commercial timberlands. Measurements are being made to determine the effects of these treatments on soil stability and yields of forage, timber, wildlife, and water. Research and pilot-scale tests are being expanded to additional areas representative of other vegetative types and various methods of treatment.

Southwestern national forests are moving into a much more intensive phase of resource management. The watershed management that has been practiced up to now has been directed primarily toward protection, with attendant soil stability and good quality of waterflow. The more intensive phase of watershed management which the Forest Service is now developing must not only continue to consider protective functions of the watershed but also give important weight to other practices affecting the quantity of water yields. Responsible stewardship of national forests requires this kind of intensive management to meet the increasing water needs of a growing population, industry, and agriculture.

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